

REMARKS

Claims 1-47, 49-81 and 83 are pending, with claims 1, 42, 45, 62 and 81 being independent. Claims 1, 33, 34, 38, 42, 45, 46, 49, 62, 81 and 83 have been amended, and claims 48, 82 and 84-90 have been canceled by this amendment. The combination of features recited by the claims distinguishes over the references of record. In view of the present amendments and remarks, reconsideration and allowance of this application are respectfully requested.

Interview Summary

Applicant would like to thank Examiner Meyer and Supervisory Patent Examiner Porta for the courtesies extended to Applicant's representative during the personal interview conducted on January 13, 2004. The foregoing amendments and following remarks reflect the substance of the interview.

Drawing Objection

An objection was made to the drawings under 37 C.F.R. § 1.83(a) as not showing certain features of claims 84 and 90. This objection is obviated by the cancellation of claims 84 and 90. Therefore, it is respectfully requested that the objection to the drawings be withdrawn.

Claim Objections

Applicant acknowledges with appreciation the indication that claims 22, 23, 32, 34, 42-44, 49, 50, 59, 61 and 81-83 recite allowable subject matter. In view of this indication, claims 42 and 81 have been amended to place them in independent form.

Claims 33 and 38 have been amended in response to the Examiner's objection. Therefore, it is respectfully requested that the objections to claims 33 and 38 be withdrawn.

35 U.S.C. § 102(e) Niu Rejection

Claims 1-3, 5, 7, 10, 11, 18, 19, 24-31, 33, 35, 36, 39, 41, 45-47, 51-58, 60, 62, 63, 73, 78 and 80 were rejected as being anticipated by Niu (U.S. Patent No. 6,433,878). Applicant requests reconsideration and withdrawal of this rejection in view of the amendment to claims 1, 45 and 62.

Independent claim 1 is directed to a method of measuring and recites, among other elements, providing an optical metrology target including a first periodic structure having a first pitch and including at least two features, "with each feature of the first periodic structure having a first width" and a second periodic structure having a second pitch and including at least two features, "with each feature of the second periodic structure having a second width differing from the first width." Applicant respectfully submits that Niu does not describe or suggest at least these features of claim 1.

Before addressing the merits, and as requested by the Examiner during the interview, Applicant notes that support for the limitations "with each feature of the first periodic structure having a first width" and "with each feature of the second periodic structure having a second width differing from the first width" appearing in claims 1, 45, and 62 may be found at least at page 10, lines 13-21 of the application as filed. This passage of the application describes a feature 120 having a feature width 122, a feature 125 having a feature width 127, and teaches that "feature width 122 may be . . . different from feature width 127."

Turning to the merits, Niu describes a method and apparatus for determining optical mask corrections for photolithography. Niu at col. 9, lines 6-8. Gratings are printed onto a wafer using a photomask having at least one grating. Niu at col. 9, lines 8-9. Design rules are used to create and correct masks containing OPC (optical proximity correction) corrections. Niu at col. 9, lines 22-25. "OPC is a new but fairly well known method of selectively altering the patterns on a mask in order to more exactly obtain the desired printed patterns in the photoresist." Niu at col. 2, lines 64-66 (emphasis added). "OPC techniques have been shown to create a more robust lithographic process . . . by creating photomask features that are less sensitive to process variations." Niu at col. 3, lines 5-8 (emphasis added).

However, Niu does not describe or suggest having each feature of the first periodic structure have a first width and each feature of the second periodic structure have a second width differing from the first width, as recited in claim 1. The grating lines that make up the grating patterns of Niu are shown and described as having a uniform width. See, e.g., Niu at col. 12, lines 7-8 ("L1 represents the linewidth of the end resist lines"). Fig. 18 of Niu shows a mask grating with two repeating features, i.e., a first pitch that repeats and a second pitch that repeats. Niu at col. 12, lines 41-43. The first pitch is the distance between adjacent lines within each group 170, 180, and 190. Niu at col. 11, lines 43-44. As shown in Fig. 18, the distance between adjacent lines refers to the distance between end line 150 and middle line 152.

The second pitch refers to the distance between adjacent groups. Niu at col. 11, lines 4-46. The bi-periodic grating pattern 140 of Fig. 18 also has OPC correction lines 142. Although the OPC correction lines 142 are shown as having a different width than the end lines 150 and middle lines 152, the OPC correction lines are used only on the mask and are not part of the grating pattern that is produced on the wafer, as shown by the description of OPC lines in Niu that is set forth above. Moreover, the OPC correction lines are not part of the repeating features (i.e., the first pitch and the second pitch) of the grating pattern. Therefore, Niu does not teach or suggest each feature of the first periodic structure having a first width and each feature of the second periodic structure having a second width differing from the first width, as recited in claim 1. For at least this reason, applicant requests reconsideration and withdrawal of the rejection of claim 1.

Claims 2-3, 5, 7, 10, 11, 18, 19, 24-31, 33, 35, 36, 39, and 41 depend from claim 1 and are believed to be allowable for at least the reasons given for claim 1.

Independent claim 45 is directed to an optical metrology target and, similarly to claim 1, recites, among other things, "with each feature of the first periodic structure having a first width" and "with each feature of the second periodic structure having a second width differing from the first width." As discussed above with respect to claim 1, Niu does not describe or suggest at least these features of claim 45. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claim 45.

Claims 46-47, 51-58, and 60 depend from claim 45 and are believed to be allowable for at least the reasons given for claim 45.

Independent claim 62 is directed to an integrated circuit and, similarly to claim 1, recites, among other things, "with each feature of the first periodic structure having a first width" and "with each feature of the second periodic structure having a second width differing from the first width." As discussed above with respect to claim 1, Niu does not teach or suggest at least these features of claim 62. Accordingly, applicant requests reconsideration and withdrawal of the rejection of claim 62.

Claims 63, 73, 78, and 80 depend from claim 62 and are believed to be allowable for at least the reasons given for claim 62.

35 U.S.C. § 102(b) Ausschnitt Rejection

Claims 84 and 85 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ausschnitt (U.S. Patent No. 6,130,750). This rejection is moot in view of the cancellation of claims 84 and 85.

35 U.S.C. § 103(a) Niu Rejection

Claims 4, 6, 12-17, 20, 21, 67, 37, 38, and 68-72 were rejected as being unpatentable over Niu. Applicant requests reconsideration and withdrawal of this rejection in view of the failure of Niu to describe or suggest the subject matter of independent claims 1, 45 and 62, as discussed above.

35 U.S.C. § 103(a) Niu/Ausschnitt Rejection

Claims 40, 74-77 and 79 were rejected as being unpatentable over Niu in view of Ausschnitt. Applicant requests reconsideration and withdrawal of this rejection because Ausschnitt does not remedy the failure of Niu to describe or suggest the subject matter of independent claims 1 and 62. In particular, Ausschnitt does not describe or suggest each feature of the first periodic structure having a first width and each feature of the second periodic

structure having a second width differing from the first width, as recited by claims 1 and 62. Instead, Ausschnitt is directed to an optical metrology tool for determining bias or overlay error in a substrate formed by a lithographic process. Ausschnitt at col. 4, lines 19-22. An array of elements is provided on the substrate, and the edges of the array are resolved with the optical metrology tool and the width of the array is measured to determine bias or overlay errors. Col. 4, lines 20-41. The individual elements of the array are not resolved. Col. 4, lines 58-59. As such, Ausschnitt does not describe or suggest each feature of the first periodic structure having a first width and each feature of the second periodic structure having a second width differing from the first width, as recited by claims 1 and 62.

Due to their failure to describe or suggest the above-noted features of claims 1 and 62, either alone or in combination, it is respectfully submitted that the proposed combination of Niu and Ausschnitt fails to establish a *prima facie* case of obviousness with regard to claims 1 and 62. Claims 40, 74-77 and 79 depend from one of claims 1 and 62, and are allowable for at least the reasons given for claims 1 and 62. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

35 U.S.C. § 103(a) Ausschnitt Rejection

Claims 62-66 and 86-89 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ausschnitt. This rejection is rendered moot in light of the amendments to claim 62 and the cancellation of claims 86-89.

As discussed above, Ausschnitt does not describe or suggest each feature of the first periodic structure having a first width and each feature of the second periodic structure having a second width differing from the first width, as recited by claim 62.

Due to the failure to teach or suggest the above-noted features of claim 62, it is respectfully submitted that Ausschnitt fails to establish a *prima facie* case of obviousness with regard to claim 62. Claims 63-66 depend from claim 62, and are allowable for at least the reasons given for claim 62. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.


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Serial No. : 10/083,877
Filed : February 25, 2002
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Intel Docket No.: 10559-591001 / P12772

Enclosed is a \$86.00 check for excess claim fees. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: February 9, 2004



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